UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/823,763	04/03/2001	Rui Ishiyama	Q63913	9124

7590 01/03/2005

SUGHRUE, MION, ZINN, MACPEAK & SEAS
2100 Pennsylvania Avenue, N.W.
Washington, DC 20037

EXAMINER	
LU, TOM Y	

ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 01/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/823,763	ISHIYAMA, RUI	
	Examiner	Art Unit	
	Tom Y Lu	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-93* is/are pending in the application.

4a) Of the above claim(s) *See Continuation Sheet* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *See Continuation Sheet* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Continuation of Disposition of Claims: Claims withdrawn from consideration are 3,5,10-12,16-20,23,25,26,34,36,41-43,47-51,54,56,57,65,67,72-74,78-82,85,87 and 88.

Continuation of Disposition of Claims: Claims rejected are 1,2,4,6-9,13-15,21,22,24,27-33,35,37-40,44-46,52,53,55,58-64,66,68-71,75-77,83,84,86 and 89-93.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of species II, claims 1-2, 4, 6-9, 13-15, 21-22, 24, 27-33, 35, 37-40, 44-46, 52-53, 55, 58-64, 66, 68-71, 75-77, 83-84, 86 and 89-93 in the reply filed on 08/03/2004 is acknowledged.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1, 31, 32, 62, 63 and 93 are rejected under 35 U.S.C. 102(a) as being anticipated by Dionysian et al (U.S. Patent No. 6,002,782).

a. Referring to Claim 1, Dionysian discloses a registration means for obtaining an registering 3-D data of all or part of one or more registered objects (electronic system 10 at column 3, line 25, includes a registration means that generates a three-dimensional digital model based on the registered face surface in the enrollment phase S1', column 3, line 32, and store/register such model in memory 10c. Note the 3-D digital model is the claimed "3-D data"; and the face surface is the claimed "registered objects" and there may be more than one face to be recognized at the enrollment phase, column 4, line 8. Additionally, in order to generate a 3-D model based on a recognized face, the recognized face must be registered in memory first); and a comparison means for obtaining 2-D data of a target object and comparing the obtained 2-D data with the data registered in the

registration means for conducting judgment concerning the similarity/sameness between the target object and each of the one or more registered objects (in the access phase step S1, a two-dimensional digital image X_i of a person's face 20, column 4, line 23, is the claimed "2-D data of a target object", and X_i is also called access image, column 4, line 24, which is compared with a new two-dimensional image derived from the 3-D transformed model, column 6, line 7-8, and correlation step is performed to obtain a correlation value at step S4 to determine the similarity/sameness between the person's face and the digital model face, column 6, lines 47-49. Note in Dionysian's system, all steps are implemented in a computer program; therefore, each means in the claim is a function step/program module. See figure 1 for steps).

b. Referring to Claim 31, Dionysian teaches the registered objects are human faces (see explanation in Claim 1 above).

c. With regard to Claim 32, see explanation in Claim 1.

d. With regard to Claim 62, see explanation in Claim 31.

e. With regard to Claim 63, the only difference between Claim 1 and Claim 63 is Claim 63 calls for additional limitation of "a machine readable record medium storing one ore more programs, which Dionysian teaches his system is implemented using a computer program stored in a memory.

f. With regard to Claim 93, see explanation in Claim 31.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-2, 4, 6-9, 13-15, 21-22, 24, 27-29, 31-33, 35, 37-40, 44-46, 52-53, 55, 58-60, 62-64, 66, 68-71, 75-77, 83-84, 86, 89-91 and 93 rejected under 35 U.S.C. 102(e) as being anticipated by Roy et al (EP 1139269 A2, priority date 03/30/2000).

a. Referring to Claim 1, Roy discloses a registration means for obtaining an registering 3-D data of all or part of one or more registered objects (Roy in paragraph [0111] teaches the invention is implemented in computer language C or C++, and the means of the invention will be modules as explained in paragraphs [0059] and [0061]. 37 3D models are the claimed "3-D data", which is obtained and stored/registered in a pilot database, and such 3-D models are registered objects of "human faces", see figure 1); and a comparison means for obtaining 2-D data of a target object and comparing the obtained 2-D data with the data registered in the registration means for conducting judgment concerning the similarity/sameness between the target object and each of the one or more registered objects (2-D photographed query of a person's face as shown in figure 1, paragraph [0030] is obtained and matched to a 3-D model to measure the mutual information between the 3-D model and the 2-D query, paragraph [0029]; note the claimed "target object" in Roy is a person's face; mutual information is the claimed "similarity/sameness").

b. Referring to Claim 2, Roy discloses a photographing means for photographing the target object and thereby obtaining an input image (the 2-D query is photographed by a camera, paragraph [0033] and paragraph [0052]); a position/pose determination means for determining the position/pose of the target object in the

input image obtained by the photographing means (paragraph [0030], the pose of the target object, a person's face, is determined, paragraph [0060], pose module); an illumination correction means for generating an image of each registered object in the same position/pose as the target object in the input image and under an illumination condition most similar to that of the input image as a reference image by use of the position/pose determined by the position/pose determination means and the data registered in the registration means (see paragraph [0030], using the input 2-D query to determine the lighting condition, the claimed "illumination condition", and render a picture for each model under the same lighting conditions as the 2-D query, paragraph [0033], step b. The rendered picture of each model is the claimed "reference image", paragraph [0060], lightsphere 60); an image comparison means for comparing each reference image generated by the illumination correction means with the input image obtained by the photographing means and thereby calculating an evaluation value concerning the similarity between the two images (paragraph [0033], step d1, the evaluation value is the likelihood value, paragraph 0062, rendering module 170); and a judgment means for judging whether or not each of the registered objects registered in the registration means is the same as or similar to the target object photographed by the photographing means based on the evaluation calculated by the image comparison means (paragraph [0033], whether a model is the correct one is determined, and the determining step/module is the claimed "judgment means").

c. Referring to Claim 4, Roy discloses a 3-D shape measurement means for measuring the 3-D shapes of all or part of the one or more registered objects (the R, N, L and b of each model are measured, paragraph [0038]); a color/intensity measurement means for photographing the registered object and thereby obtaining information concerning color or intensity of the registered object ([paragraph 0040], image intensity of each model is obtained); and a data storage means for storing the 3-D shapes measured by the 3-D shape measurement means and the color/intensity information obtained by the color/intensity measurement means as the registered data (a memory storage is inherently incorporated in a computer stored the data).

d. Referring to Claim 6, Roy discloses an image generation means for generating images of each registered object in the same position/pose as the target object in the input image and under various illumination conditions as illumination variation images by use of the position/pose estimated by the position/pose determination means and the data registered in the registration means (surface normals, surface images of each 3-D models, are generated upon determination of the object pose/position in the 2-D query, paragraph [0037]; and the surface normals are the claimed "images" generated by image generation means); and an illumination condition estimation means for generating an image that is the most similar to the input image obtained by the photographing means by the image generation means and outputting the generated image to the image comparison means as the reference image (through measure of errors, paragraph [0037], a

picture that is closest to the 2-D query is rendered, paragraph [0046] and paragraph [0047]]).

e. Referring to Claim 7, Roy discloses the illumination correction means further includes an illumination variation image space generation means for generating an illumination variation image space which is spanned by the illumination variation images generated by the image generation means; and the illumination condition estimation means generates the image that is the most similar to the input image from the illumination variation image space generated by the illumination variation image space generation means and outputs the generated image to the image comparison means as the reference image (A (n) in equation 23 is the claimed "illumination variation image space").

f. Referring to Claim 8, Roy discloses the illumination variation image space generation means generates basis vectors of a space that almost accommodates image variation due to the illumination variation by conducting principal component analysis to the illumination variation images generated by the image generation means (a surface normal is created for each subpart of 3-D model, paragraph [0073]); and the illumination condition estimation means obtains inner product between the input image obtained by the photographing means and each of the basis vectors generated by the illumination variation image space generation means, generates the image that is the most similar to the input image by use of the basis vectors and based on the inner products, and outputs the generated image to the image comparison means as the reference image

(paragraph [0081], n is the claimed "basis vectors", and see equation 35 for inner product I(p)).

g. Referring to Claim 9, Roy discloses wherein the illumination correction means further includes an illumination condition variation means for setting various illumination conditions and outputting the illumination conditions to the image generation means (paragraph [0061], the lightsphere module 60 is the claimed "illumination condition variation means", and outputs lightings from directions).

h. Referring to Claim 13, Roy discloses wherein the position/pose determination means outputs a predetermined position/pose to the illumination correction means (pose module 120 output a predetermined pose to the lightsphere module 60, paragraph [0062]).

i. Referring to Claim 14, Roy discloses wherein the position/pose determination means receives inputs concerning position/pose from the outside, and outputs the received position/pose to the illumination correction means (the pose module 120 receives the pose information from the input 2-D query, and outputs the information to lightsphere module 60).

j. With regard to Claim 15, see explanation in Claim 14.

k. With regard to Claim 21, see explanation in claims 2 and 4, and also see paragraph [0038] for reflectance R on each point of the 3-D model.

l. With regard to Claim 22, see explanation in Claim 8.

m. Referring to Claim 24, Roy discloses wherein the 3-D shape measurement means obtains the 3-D shapes by reading data or drawings (Roy teaches the 3-D shapes are obtained through scanning device 20, paragraph [0059]).

n. With regard to Claim 27, see explanation in Claim 24.

o. With regard to Claim 28, see explanation in Claim 1.

p. Referring to Claim 29, Roy discloses wherein the judgment means searches for one or more registered objects that are similar to the target object (paragraph [0062]).

q. Referring to Claim 31, Roy discloses wherein the registered objects are human faces (paragraph [0059]).

r. With regard to Claim 32, see explanation in Claim 1.

s. With regard to Claim 33, see explanation in Claim 2.

t. With regard to Claim 35, see explanation in Claim 4.

u. With regard to Claim 37, see explanation in Claim 6.

v. With regard to Claim 38, see explanation in Claim 7.

w. With regard to Claim 39, see explanation in Claim 8.

x. With regard to Claim 40, see explanation in Claim 9.

y. With regard to Claim 44, see explanation in Claim 13.

z. With regard to Claim 45, see explanation in Claim 14.

aa. With regard to Claim 46, see explanation in Claim 15.

bb. With regard to Claim 52, see explanation in Claim 21.

cc. With regard to Claim 53, see explanation in Claim 22.

dd. With regard to Claim 55, see explanation in Claim 24

ee. With regard to Claim 56, see explanation in Claim 25.

ff. With regard to Claim 58, see explanation in Claim 27.

gg. With regard to Claim 59, see explanation in Claim 28.

hh. With regard to Claim 60, see explanation in Claim 29.

ii. With regard to Claim 62, see explanation in Claim 31.

jj. With regard to Claim 63, the only difference between Claim 63 and 1 is Claim 63 calls for additional limitation of "a machine readable record medium storing one or more programs", which Rory teaches implementing his invention on a computer, which inherently includes a machine readable record medium storing one or more programs.

kk. With regard to Claim 64, see explanation in Claim 2.

ll. With regard to Claim 66, see explanation in Claim 4.

mm. With regard to Claim 68, see explanation in Claim 6.

nn. With regard to Claim 69, see explanation in Claim 7.

oo. With regard to Claim 70, see explanation in Claim 8.

pp. With regard to Claim 71, see explanation in Claim 9.

qq. With regard to Claim 75, see explanation in Claim 13.

rr. With regard to Claim 76, see explanation in Claim 14.

ss. With regard to Claim 77, see explanation in Claim 15.

tt. With regard to Claim 83, see explanation in Claim 21.

uu. With regard to Claim 84, see explanation in Claim 22.

vv. With regard to Claim 86, see explanation in Claim 24.

ww. With regard to Claim 89, see explanation in Claim 27.

xx. With regard to Claim 90, see explanation in Claim 28.

yy. With regard to Claim 91, see explanation in Claim 29.

zz. With regard to Claim 93, see explanation in Claim 31.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 30, 61 and 92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roy et al. The arguments in Paragraph 3 above as to the applicability of Roy are incorporated herein.

a. Referring to Claim 30, Roy does not explicitly disclose the registered objects are automobiles, however, Roy teaches his invention is applicable to numerous and various types of objects to be recognized, not limited to only human faces. A person of ordinary skill in the art would have been motivated to do this because the process of Roy's system to perform automobile recognition is the same as facial recognition, the only slight modification is the models stored in the database.

b. With regard to Claim 61, see explanation in Claim 30.

c. With regard to Claim 92, see explanation in Claim 30.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom Y Lu whose telephone number is (703) 306-4057. The examiner can normally be reached on 8:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tom Y. Lu